Amendments to the Claims

The listing of claims will replace the previous version, and the listing of claims:

Listing of Claims

1. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal, said method comprising;

a step of forming a control layer having a larger defect density D_{cont1} than ~~the~~ a defect density D_{ferro} of said ferroelectric single crystal ($D_{ferro}<D_{cont1}$) ~~on~~ in a first face perpendicular to ~~the~~ a direction of polarization of said ferroelectric single crystal in said ferroelectric single crystal,

a step of forming a first electrode on said ~~control layer~~ first face,

a step of forming a second electrode having a smaller area than ~~the~~ an area of said first electrode on a second face being opposite to said first face of said ferroelectric single crystal, and

a step of applying an electric field between said first electrode and said second electrode, in which ~~the~~ a spontaneous polarization possessed by a domain inverted region generated from said second electrode is terminated through said control layer at said first electrode side, and

wherein said control layer functions as physical hindrance for a growth of said domain inverted region to said first electrode by said larger defect density D_{cont1}.

2. (Original) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 1, wherein said ferroelectric single crystal is substantially stoichiometric lithium niobate or lithium tantalate.

3. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 2, wherein said substantially stoichiometric lithium niobate or lithium tantalate comprises an element of 0.1 to 3.0 mol%, said element being selected from [[a]] the group consisting of Mg, Zn, Sc and In.

4. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal ~~according to claim 1~~, said method comprising;

a step of forming a control layer having a larger defect density D_{cont1} than a defect density D_{ferro} of said ferroelectric single crystal ($D_{ferro}<D_{cont1}$) in a first face perpendicular to a direction of polarization of said ferroelectric single crystal in said ferroelectric single crystal,

a step of forming a first electrode on said first face,

a step of forming a second electrode having a smaller area than an area of said first electrode on a second face being opposite to said first face of said ferroelectric single crystal, and

a step of applying an electric field between said first electrode and said second electrode, in which a spontaneous polarization possessed by a domain inverted region generated from said second electrode is terminated through said control layer at said first electrode side,

wherein the step of forming said control layer comprises;

a step of depositing a metal layer selected from [[a]] the group consisting of Nb, Ta, Ti, Si, Mn, Y, W and Mo on said first face, and

a step of annealing said metal layer.

5. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 1, wherein the step of forming said control layer comprises a step of annealing said first face in an atmosphere selected from [[a]] the group consisting of an inert atmosphere, an oxygen atmosphere and a vacuum atmosphere to out-diffuse atoms from said first face.

6. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 1, said method further comprising a step of forming a further control layer including a first region and a second region [[on]] in said second face, wherein the defect density of said second region is equal to the defect density D_{ferro} of said ferroelectric single crystal and the defect density D_{cont2} of said first region is larger than the defect density D_{ferro} of said second region ($D_{ferro}<D_{cont2}$), and

wherein said further control layer functions as physical hindrance for the growth of said domain inverted region in a direction perpendicular to the direction of polarization by said larger defect density D_{cont2} of said first region.

7. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 6, wherein the step of forming said further control layer comprises;

a step of depositing a metal layer selected from [[a]] the group consisting of Nb, Ta, Ti, Si, Mn, Y, W and Mo on said second face, and

a step of annealing said metal layer.

8. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 6, wherein the step of forming said further control layer comprises a step of annealing said second face through a mask in an atmosphere selected

from [[a]] the group consisting of an inert atmosphere, an oxygen atmosphere and a vacuum atmosphere.

9. (Original) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 1, wherein said first electrode is a flat electrode and said second electrode is a periodic electrode.

10. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 1, said method further comprising a step of removing said first electrode, said second electrode and said control layer after said step of applying an electric field.

11-14. (Canceled)

15. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal, said method comprising;

a step of forming a control layer having a lower degree of order of lattice points than ~~the~~ a degree of order of lattice points of said ferroelectric single crystal [[on]] in a first face perpendicular to ~~the~~ a direction of polarization of said ferroelectric single crystal in said ferroelectric single crystal,

a step of forming a first electrode on said ~~control layer~~ first face,

a step of forming a second electrode having a smaller area than ~~the~~ an area of said first electrode on a second face being opposite to said first face of said ferroelectric single crystal, and

a step of applying an electric field between said first electrode and said second electrode, in which ~~the~~ a spontaneous polarization possessed by a domain inverted region generated from

said second electrode is terminated through said control layer at said first electrode side, and

wherein said control layer functions as physical hindrance for a growth of said domain inverted region to said first electrode by said lower degree of order of lattice points.

16. (Original) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 15, wherein said ferroelectric single crystal is substantially stoichiometric lithium niobate or lithium tantalate.

17. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 16, wherein said substantially stoichiometric lithium niobate or lithium tantalate comprises an element of 0.1 to 3.0 mol%, said element being selected from [[a]] the group consisting of Mg, Zn, Sc and In.

18. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 15, wherein the step of forming said control layer comprises a step of implanting ions selected from [[a]] the group consisting of rare gases, Zn, Nb and Mn into said first face.

19. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 15, said method further comprising a step of forming a further control layer including a first region and a second region [[on]] in said second face, wherein ~~the~~ a degree of order of lattice points of said second region is equal to ~~the~~ a degree of order of lattice points of said ferroelectric single crystal and ~~the~~ a degree of order of lattice points of said first region is lower in comparison

with the degree of order of lattice points of said second region, and

wherein said further control layer functions as physical hindrance for a growth of said domain inverted region in a direction perpendicular to the direction of polarization by said lower degree of order of lattice points of said first region.

20. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 19, wherein the step of forming said further control layer comprises a step of implanting ions selected from [[a]] the group consisting of rare gases, Zn, Nb and Mn into said second face through a mask.

21. (Original) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 15, wherein said first electrode is a flat electrode and said second electrode is a periodic electrode.

22. (Currently amended) A method of forming a domain inverted region in a ferroelectric single crystal according to claim 15, said method further comprising a step of removing said first electrode, said second electrode and said control layer after said step of applying an electrode field.

23-26. (Canceled)